

Cybertextspace: Culture as Program – Textual Sign Spaces and Textual Signs of Space as result

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Introduction

The term culture turns out to be multifaceted: culture vs. nature, material vs. mentality are topics which are highly disputed. The basis of my investigation was an understanding of culture as program. This means that culture is not defined by its artifacts but as an underlying program of semiotic coding which is the basis for our construction of reality and possible worlds.

Lotman's thesis that there exists a parallel between consciousness, text and culture points to the capacity of texts to represent our perception of space. Signs of space in texts are products of a complex process of linearization which have to transform three-dimensional space into linear and therefore one-dimensional language. The term sign spaces refers to the possibility of texts to create their own spaces in a metaphorical sense. Iser's hypothesis that so called "reality" and the construction of virtual spaces in literature do not have to be interpreted as opposition but as mediated by imagination was leading my analysis. The example of the literary construction of spaces demonstrates that the experimentation with patterns of our perception leads to an esthetic transformation of space which becomes fragmented and mosaic.

The reciprocal influence of the different arts broadens the possibilities of narrative space in completely new ways. We have to give up models which try to describe the text as one world in favor of an open multifaceted view of textuality. The text as a labyrinth of a network in which all nodes are serially connected forms an unlimited space. The text can be described as the number of its possible links. It communicates by branching out. The texttheories of Barthes, Kristeva, Derrida and Eco come to be the program for the description of the new hypermedia.

The new hyperculture cannot be conceived solely within traditional categories, because it stands for a cultural state of permanent dynamics. It is a continuous revision and interpretation of categories, and therefore of possible cultures, which

let its influence grow as a political, economic, and cultural space of tomorrow. The suspension of borders, spatial proximity which is simulated by the worldwide networked information, cyberspace as space in space open up reflections on fictionality of space in general. Hyperspace represents and comments on this imaginary spatialization without making the new boundaries visible. For the present a universal hyperculture is just a result of discourse and therefore a product of imagination.

Cognitive space

Perception

The interpretation of different perceptual cues take place at a high cognitive level, where they are mapped onto the cognitive representation of space. That means that there is no direct connection between perception and language. Perceptual features are reflected in language only via conceptualization. As Lakoff (1987) defines it: "SEEING TYPICALLY INVOLVES CATEGORIZING". Seeing includes always seeing-as, that is categorizing what is perceived. Perception has to do with the interaction between the perceiver and the perceived world. Lakoff and Johnson (1980) describe metaphor as a fundamental principle of conceptual organization, which is based on facts of our physical and cultural experience, as the field of spatial metaphors show. The natural connection between body and space (movement in space, upright posture) is the basis for our cognition of space. The embodiment of concepts provides an iconic connection between the perceiver and the perceived world. The mediation between perception and language is achieved by social, cultural and cognitive schemata which can be named as semiotic determinants of linearization.

Conceptualization

The way we describe the experience of our spatial environment reveals important insights into the relation between language and cognition. Since the description of space presupposes a previous cognition of space of the environment, it may be assumed that the verbalization of spatial experience yields also insights into the process of perceiving space. The metaphorical schemata which represent loci and movement within the text reflect "the cognitive conditions of unhindered vision and movement in space" (Nöth 1995). By categorizing the structures of our perceptions, we find access to the world we live in. Categorization has to be seen as a motivated act of construction. The organization of our memory defines the concepts we choose and how we compose texts in the process of verbal linearization. Metaphors

which are derived from cultural artifacts such as buildings or maps show that culture, too, provides spatial models for metaphoric schemata. So we can conclude that the mediation between perception and language is achieved by social, cultural and cognitive schemata which can be named as semiotic determinants of linearization.

Imagination

The term 'imagination' has the connotation of artistic creativity, fantasy and invention. This is the romantic view of imagination which has influenced our understanding of art since the 19th century. But creativity is only one aspect of imagination. The most important function of imagination is its capacity to organize mental representations into coherent units as Mark Johnson (1985: 140) pointed out. Imagination is central to our experience and cognition, and our reasoning about it. It permeates our embodied spatial, temporal and culturally formed understanding. Imagination functions as mediation between perception and categorization. It transforms the perception of realities into possibilities and in so far it is the basis of the creation of possible worlds – the "As-If" of imagination.

Memory and Space

Landscape and spatial configurations have been used as mnemotechnical media in various cultures. One of such mnemotechnical systems was invented in ancient Greece. In the process of memorizing a speech, the rhetoricians were advised to imagine a house with several rooms, each room with conventional loci where to imagine a picture representing a subject of the prepared discourse. While speaking, the rhetorician imagined a path for walking from one picture to another, which he would follow in the course of his speech. Hence, the linearity of speech corresponds to the linearity of the path from room to room.

Another example of a spatially based mnemotechnical device is a system invented by the Australian Aborigines. This system consists of paths connected in a network which they call Songlines (cf. [Winkler 1994](#)). The traditional knowledge of these tribes is mediated by songs in which the verses follow an ordering that is analogous to a journey in which the traveler orients him- or herself by landmarks. These landmarks are present in the real living space of the Aborigines and are connected according to a linear schema. Both systems use space and everyday experience in space as a tool of remembering, but they differ in a fundamental aspect. Imagining a house with rooms and loci for pictures follows a concept of space as a container with fixed boundaries. The imagination of networked paths as used by the Aborigines, is not a territory with boundaries, but a complex net of lines and pathways. The difference between the ancient and the Aboriginal concept may be

summarized by the formula: CONTAINER, CLOSURE, LINEARITY vs. OPENESS; NETWORK; LINEARITY. These different spatial concepts can also be observed both in metaphorical concepts which refer to the architecture of text and in the discursive space of text and hypertext.

Writing

Writing and reading leads to awareness of linguistic structure and awareness of language structure, which is a product of writing, and not a precondition for its development (Olson 1994: 69). In the same sense, spatial configurations are not only a product, but the producers of a cognitive system. This is what Derrida meant when he talked about writing as being prior to speech. He defines writing not as the activity of writing, but as the movement of differentiation of sign systems (différance). Language, like any other code, constitutes itself as a texture of differences. Difference and opposition are the cognitive foundations of semiosis and therefore the precondition for every semiotic coding. This is a process which leads to an unbounded referring of signs. Writing in Derrida's sense creates networks by "spacing of speech" (Derrida 1967: 39) and can be interpreted as a metaphor of the human mind.

Dispersion

In the course of historical evolution, the way humans perceive their world has changed like their way of living has changed (Benjamin 1963:14). The expansion of cities has brought about a new cognitive organization of perception. Perception has profoundly become disturbed by stimulus satiation. In this context, Moholy-Nagy (1947: 245) writes:

"Motion, accelerated to high speed, changes the appearance of objects and makes it impossible to grasp their details. There is a clearly recognizable difference between the visual experience of a pedestrian and a driver in viewing objects. The motor car driver or airplane pilot can bring distant and unrelated landmarks into spatial relationships unknown to the pedestrian. The difference is produced by the changed perception caused by the various speeds, vision in motion".

Velocity has dispersed visual perception in discontinuous impressions of the perceived phenomena. This dispersion is mirrored in literature in the way our attitude towards reading and interpreting texts has changed. Like the model of the iconic sign, the model of narrativity is being derived from everyday perception. This coherence between perception and narrativity has lead to a change of style in the arts at the beginning of our century (Smuda 1992), which demands the competence of the reader. The reciprocal influence of the different arts broadens the possibilities of narrative space in completely new ways. The same increase of velocity and

stimulus satiation is achieved in the medium of hypertext, which leads to the difficulty that we deal with a space which stretches our capacity of imagination. Therefore, the hypertextual data space is virtually constructed as a landscape by metaphors of space which we also use in other fields of experience in order to make us acquainted with the new medium.

Textual representation of space

Verbal representations of space are related to the space they describe by a sign relation comprising three components. The first is the sign vehicle consisting of the sequence of words which describe the spatial environment. The second is the object of reference, the spatial environment as such, and the third is the mental representation of the spatial perception. Within this triad, space is never an unsemiotically given piece of reality. Space is always a semiotic phenomenon insofar as its structure depends on the process of human perception. Even as a referential object, space is not an independently given phenomenon of the "real" world itself but depends on the cognitive capacity and structure of the perceiving mind.

Cohesion

Textual linearity is more than mere sequence. It depends on devices which provide cohesion, such as deixis, anaphora or reader instructions of the type "see above". These cohesive devices construct larger syntactic entities which are hierarchically structured and in sum lead to macrotextual structures like paragraphs, sections, and chapters. These structures can be compared to landmarks which provide the reader with information concerning his or her whereabouts. The text described in topological terms, consists of units and connections between them. Furthermore typographical convention will help the reader to predict which object will follow next: a new section, paragraph, or a new sentence. Connection by reader instructions undermine partly the congruence and linearity of discourse.

Coherence

Not only reader instructions, but also the structure of textual coherence reflect the cognitive order of the author's knowledge. Textual coherence is apparent in semantic recurrence and reinforced by the device of summarizing. However, coherence is not only provided by the author, but also created by the reader in the act of reading. The construction of coherence depends on the reader's knowledge,

interest, and the time he or she will spend with the text. In hypertext, coherence has to be created by the user in the act of reading, and therefore it is not totally different from traditional forms of reading. The reading paths of the user are linear and they are constructed in the process of reading. The connection between the different entities or chunks is associative and guided by the reader's interests. The chunks of a hypertext themselves are passages of traditional texts. The difference to traditional texts lies in the fact that cohesion between different nodes is avoided because the user has the possibility to come to one node through different paths. "A node is something through which other things pass, and which is created by their passage" (Slatin 1991: 162). Coherence in hypertext is nothing else than the reader's performance of constructing a connection which is governed by metatextual instructions so that the reader is able to perceive the pattern that connects.

Linearization

Levelt (1989: 138) defines linearization as follows: We "arrange information for expression according to the natural ordering of its content". The source of the linearization process is the organization of the speaker's prelinguistic experience. The ordering depends on the topic of discourse and the reader's interest. A natural or iconic ordering can be compared to a path in the sequence from source to goal. Textual coherence depends on iconicity or indexicality in discourse.

Semiotic representation of space

Following Peirce, the relation between the signs of spatial descriptions and their object of reference is symbolic, indexical, or iconic. According to this semiotic typology, symbols are conventional, arbitrary, and general signs. Lexemes such as room, hall, attic, or corner are symbols in this sense. There seems to be no natural relation between these words and their object of reference.

An index is a sign which stands in a relation of contiguity or causality to a particular object in a specific situation. In language, such indexical signs occur in the interactional situations in which utterances are used. They include indicators of the identity of speech participants, their location and orientation in space, and the time of the utterance. Deictic spatial and temporal expressions in language and many nonverbal expressions are examples of indexical signs.

The iconic sign is related to its referent by similarity or analogy. Following the hypotheses of Enquist (1986) and Ehrich (1989), texts are structured by principles of discourse organization and not by rules. What is the nature of these principles? According to Ehrich, the principles of textual organisation are more communicative,

aesthetic, and psychological than grammatical. The most basic principle of discourse organization is a principle of iconicity. Among other things it privileges a natural ordering which the ancients have called *ordo naturalis*. The principle, however, cannot be followed in texts which describe simultaneity of events and in particular the simultaneous perception of spatial configurations. In the light of Charles Sanders Peirce's theory of iconicity, the verbal patterns of spatial descriptions evince imaginal, diagrammatic, and metaphoric iconicity. These categories of iconicity represent their object with an increasing degree of abstraction.

Image

Images are sign vehicles which share mere qualities with their object of reference. Stylistic means of imaginal iconicity in texts are repetition, rhythm, duration, and tempo. The qualities which these devices represent are structures of time, sequence, or quantity. In literature, delaying and accelerating of tempo are techniques of reflecting the protagonists' temporal sensation of actions and events. The possibility of reproducing space by means of imaginal iconicity is limited. An example is typographic iconicity as used in visual poetry. Another iconic potential of imaginal iconicity is used in certain onomatopoeic features of the vocabulary of space. Consider the semantic opposition between cranny, nook, chest on the one hand and place or hall on the other. In these examples, the small spaces are expressed by means of short forms with a relative high phonetic constriction.

Diagram

Diagrams, according to Peirce, are icons which represent the relation of the parts of one thing by analogous relations in the sign vehicle. There are structural correspondences between the sign vehicle and its referential object. Since only relations and structures are considered, diagrammatic icons evince a certain degree of arbitrariness. Because of the digital and linear character of language, diagrammatic icons are more frequent in texts than imaginal icons. Diagrammatic iconicity appears in texts when linear relations within the text stand for temporal, spatial, causal, or social relations in the described world. These extralinguistic relations, which structure our experience as complex principles of order, are mirrored in the text as icons. A verbal description of space is necessarily less iconic than a description of time because complex visual expressions have to be transformed by a process of linearization into a temporal succession first. This projection of a temporal structure onto an originally spatial one has the following effect: static objects and configurations in space are now represented in the temporal medium language and are thus transformed from static to dynamic. The

asymmetry between objects and configurations in space on the one hand and the temporality of spatial representation on the other is evident.

Metaphor

According to Derrida, the text "is a differential network, a fabric of traces referring endlessly to something other than itself, to other differential traces. Thus, the text overruns all the limits assigned to it so far" (Derrida 1979: 84). Traditional linear texts have created in the reader an expectation of structural stability as an inherent feature of the physical object text. This assumption is mirrored in spatial metaphors of textuality which create an imaginary textual space of its own.

Spatial metaphors of textuality and hypertextuality produce a textual space which guides the reader's orientation in the process of reading. Following Lakoff and Johnson (1980: 3), metaphor is a basic cognitive principle of organization, both of language and of thinking: "metaphor is pervasive in everyday life, not just in language, but in thought and action. Our ordinary conceptual system, in terms of which we both think and act, is fundamentally metaphorical in nature." Metaphor is not just a figure of speech and a linguistic phenomenon, but includes a cognitive dimension. The investigation of metaphor under this conceptual aspect leads to metaphorical systems which show that metaphor is not an arbitrary and singular phenomenon, but a means to express our experience and action.

Cognitive experience, cultural and social conventions, provide the framework for the development of cognitive concepts. The importance of space is mirrored in the broad area of spatial metaphors we use, the metaphorical subsystem "space", which Lakoff and Johnson call "orientational metaphors". This metaphoric subsystem has its origin in our everyday experience in space, e.g., our upright posture or movement and orientation in space. Conceptual abstraction from our perception governs the construction of spatial concepts which are applied as metaphorical extensions to other fields of experience.

The semiotic effect of connection

What is the effect of connection from a semiotic point of view? Following Peirce, connection has two possible functions: connection effected by contiguity is the basis of the indexical sign. One segment points to the other. This is the principle of anaphora, and of hypertextual instructions. They point to other nodes which are related in a causal way. The other possibility is connection by similarity or analogy, which is the basis of the iconic sign. This iconic connection is used above all in connections between nodes of different codes: linguistic, visual, musical, codes which are all inherent in hypertext.

Connection or links are the main features of hypertextuality, as Landow (1994) points out. Links in hypertexts are like spatial contiguity in other media. Linking has often been described as non-hierarchical (Bolter 1990, Kuhlen 1991), but an invisible kind of hierarchy results in the different densities of chunks and nodes. This density creates a new proximity and distance. By frequent use, hypertextual nodes develop to so called "islands" in the hypertextual net. This development is based on the degree of log-in time and access possibility. These islands of hypertextual preference are the result of the semiotic processes of differentiation, oppositions generate textual meaning.

Narrative space

"Cyberspace can be seen as an extension ... of our age-old capacity and need to dwell in fiction, to dwell enlightened and empowered on other, mythic planes" (Benedikt 1991: 6).

I will discuss this thesis by using the computer game *Myst* as example. According to Adams (1996a) the narrative is understood as a special type of sign use, which emphasizes the relationship between the narrative act and the narrative text. This opens up the possibility to have a closer look at the spatial or temporal structure of a narration as well as a look at the act of constructing or re-constructing the narrative in interpretation. This point of view allows for an interpretation of the structure of computer games without neglecting their interactive dynamics.

Intertext

Intertextuality divides the text into two axes: a horizontal axis, which is the linear connection between author and reader through the text, and a vertical axis, which connects the text to other outer texts "of the anterior literary corpus and the text as an absorption of a reply to another text" (Kristeva 1980: 69). These two axes create a two-dimensional space. There is no fixed position in the connection between these four elements. There is only movement between author, reader, text, and intertext. This movement is the movement of "différance", only available as a trace which can be elucidated in interpretation. The virtual presence of many voices is interwoven in these intertextual relation. As Barthes (1977: 146) puts it, "the text is not a line of words but a multidimensional space in which a variety of writings, none of them original, blend and clash."

Intratext

A specific textual technique in text and hypertext which produces a further narrative dimension is *mise en abîme*. It is a device of mirroring a content or a specific textual structure to different points in texts and thus creates different levels of textuality. The term originates from heraldry. Shields in the middle ages used to be decorated with coats of arms depicting the knight's personal heraldry. Thereby the spatial impression of depth or even of an abyss (French: "abîme") is created. (Such a semiotic technique was picked up in postmodern literature). It leads to a multiplication of a topic in a spatial and not in a temporal mode. It is a form of telling and showing at the same time, a kind of repetition of same entities, a reflexive structuration, which results in a front to back dimensionality, thus creating a three-dimensional narrative space.

Discourse-as-discoursed

Following Liestol (1994), Genette's discourse - story dichotomy has to be extended with hypertexts to cover a third aspect: the discoursed text, or, as he calls it, "discourse-as-discoursed" (Liestol 1994: 96). The passage from one node to the other is based on the selection and combination of elements. This combination linearizes entities of a spatial, networked configuration of nodes and links. Such linearization can be compared to linearization processes which underlie the transfer of complex and simultaneous nonverbal perceptions into language. Different possibilities of selection in different situations create a multiplicity of linear discourses. This virtual multiplicity of linearities depend on different reader perspectives and contexts which can be chosen. Therefore, multiplicity of linearity instead of non-linearity should be the key word in discussing the reading process in hypermedia. "...non linear is an empty term in the discourse on hypermedia that only shows how preoccupied writers on the subject have been with defining hypermedia in opposition to traditional media" (Liestol 1994: 110).

Possible Worlds

Eco (1990) describes narrative worlds as possible worlds which provide structures, but not one specific narrative world. When we follow this idea in respect to narrative theory we have to give up models which try to describe the text as one world in favor of an open multifaceted view of textuality. Narrative worlds as possible worlds are cultural artifacts and therefore subject to semiotic stipulation. A possible world, which Eco calls a "furnished" world, is not the linear discourse of the text, but designed in the cooperative interaction between text and reader. The universe of discourse which is chosen to design a possible world has to be described with respect to its specific organization of space.

Open Spaces

The labyrinth of a network in which all nodes are serially connected forms an unlimited space. The idea of a serial connection in thought was developed by Eco in his *Opera aperta* (1962), where he develops his ideas in opposition to models of textual closure in static structuralism: even if traditional texts are materially bounded, they are virtually open in their narrative organization.

The narrative modes of connection in hypertext are allusion, quotation, reference, and linking. These modes open up the narrative space and can be interpreted as "different functions of intertextuality, just as Usenet newsgroups, electronic mailing, lists, paperback bestsellers, and flysheet" (Aarseth 1994: 71). Therefore, Aarseth suggests that we distinguish more adequate forms of textuality rather than insist on the crucial distinction between traditional and electronic texts, in particular because the seemingly textual integrity and stability of traditional texts is not an inherent quality of the physical object "text", but a cultural construct which is the result of interpretation. In the words of Landow (1992: 119): "Even within the vastness of hyperspace, the author, like the reader-author, will find limits, and from them construct occasions to struggle."

Narrative Space in Computer Games

Narrative space in Genette terms is based on the distinction between discourse and story, which leads to the distinction between discursive space and narrative space. While the textual space of discourse is linear and depends on the linearization process of language, the narrative space of story is without such restrictions of unilinearity and we can freely move within the temporal shifts of narrative development. Nevertheless, computer games use narrative structures to organize their worlds. A semiotic structure is projected onto the game to construct a possible world, which plays with traditional literary motifs and structures of time and space. Depending upon the player's response the computer presents more space, more images, more text to explore. While a printed fictional text presents its episodes in one order, the digital space of the computer game removes that restriction. The movement between the episodes and places is dependent on the player's interactions with the game or intrusions into the given space. The player's "reading" experience depends on his or her decisions and interaction. This interaction between author or programmer and game and reader or player and game calls up Bakhtin's dialogic concept or Kristeva's concept of intertextuality, which are fundamental for the concept of narrative space. Fictional works, for example the fairy-tale in its traditional form, as well as its modern forms, such as fantastic literature and science fiction function as source for the intertextual narrative space in *Myst*.

Umberto Eco

A Classic of Semiotics?

Has Umberto Eco become a classic of semiotics? In 1981, when M. Krampen et al. edited their *Classics of Semiotics*, Eco was still among the writers on the classics and not yet one of the classics of semiotics himself. More recently, an ever increasing number of publications on Eco's own semiotic writings seem to suggest that the author has now become a classic of semiotics himself. Since Eco has become world famous, many of his theoretical writings have appeared which are collages of his own earlier publications. It may still be too early to decide whether he will emerge as a classic of theoretical semiotics from these writings, but the enormous critical echo of his fictional semiotic writings testifies to the fact that Eco is a classic of semiotic literature of our times.

Between Semiotic Theory and Fiction

Eco's semiotic research covers five main areas, which almost give an encyclopaedic panorama of the semiotic field: (1) general semiotics, (2) semiotic philosophy of language, (3) aesthetics, (4) literary and text semiotics, and (5) semiotics of popular culture and the mass media. Many of his ideas in theoretical semiotics are reflected and fictionally transformed in his prose work: The Name of the Rose (1980, tr. 1983) and Foucault's Pendulum (1988, tr. 1989), The Island of the Day Before (1995), which are in so far semiotic novels and may be said to belong to the field of applied semiotics.

Semiotics and Culture

Eco extends semiotics to a general theory of cultural behavior, which Bettetini (1986: 307) characterizes as follows: "semiotic methods seemed applicable to the whole sphere of the human activity, and at the same time, any semiotic practice seemed to be a part of a general and holistic semiotics of culture."

Eco's studies in popular culture and the mass media, such as advertising, comics, film, television or detective novels seem to have been a rich source of inspiration for his own successful semiotic novels. His own position towards popular culture is neither that of the 'apocalyptists,' who deplore the decline of culture in the mass media, nor that of the 'integrationists,' who passively fall victim to the illusions generated by these media (Eco 1964). Instead, he recommends a critical attitude whose foundation is the semiotic analysis of the form of culture.

Text Semiotics

Eco develops his text semiotic that defines the role of the reader as being situated between textual closure, arising from authorial intention and other limits of interpretation, and interpretative openness, resulting from a multiplicity of hermeneutic codes and from semiosis as being an inferential process allowing an infinite series of interpretations (see also Lewis 1985).

Eco focusses on his view of the encyclopaedic nature of the semantic system, in which we find a key to Eco's text semiotics. In the semantic network and labyrinth of an encyclopaedia, all conceptual nodes are connected to form an unlimited semantic space. Thus, every sign is linked to the whole semantic universe, as Eco later puts it (1984: 46): "A sign is not only something which stands for something else; it is also something that can and must be interpreted. The criterion of interpretability allows us to start from a given sign to cover step by step the whole universe of semiosis."

An important source of Eco's encyclopaedic account of meaning is the idea of serial thought. This idea, first introduced in Opera Aperta and resumed in later writings, forms an antithesis to the models of a static structuralism by relating meaning to the unlimited chain of messages to which it is serially connected.

Narrative Time

When we examine what a narrative provides, we find as its most important feature the sequence of events, which leads to a final event or solution. That means that the sequence of events explains this final event. As a result the narrative - its structure and purpose - is an explanation. This explanation is developed along the lines of narrative time. Genette divides narrative time into three sections. Each time-category has to be seen as the relationship between the single event and the narrative whole. The categories are order, duration, and frequency.

Order

Order in a printed narrative text is the relation of the chronology of the events being told and the order of the narrative. According to Genette's analysis this order can be described as a fixed relation which is the result of the book's materiality. Computer games cannot be described in the same terms. Neither are the single episodes fixed in the order a player explore them, nor is the order of the narrative itself fixed. The chronology of the events or places is interchangeable. The only fixed points are places, where a code has to be solved and where the pages and books are hidden.

The beginning of our travel and the end are fixed points in the game, but there is no order in Genette's sense. Within these very few fixed points there are multiple readings with different chronologies and not one fixed order.

Duration

According to Genette duration does not refer to the reading time of a single reader, but to the time a single event needs. We find variations in the speed of the narrative in relation to itself and measure effects of acceleration, deceleration, stasis, and ellipsis. As the time of the events in a computer game is dependent on a player's performance and not on the written space an author assigns to it, duration is not a given entity.

Frequency

Frequency or repetition seems to be a time-category which is applicable to computer games. The example of *Myst* shows that frequency is one of the most important categories. The library - which is the central place in *Myst* - has to be visited several times to insert the pages into the books or to find information about the codes. As the player has to return to it again and again, the temporal structure of *Myst* can be described better as cyclical than as chronological. The cycle of events leads to the final event and the solution of the mystery of this game. It is not the sequence of events or their causal order that make us understand the final event, but their function as elements in a puzzle which has to be composed.

Point-by-Point

With digital media we find a new time-category, which is not described in Genette's scheme. This new category can be described as point-by-point. *Myst* allows its players to change into a jumping mode and to return to places where they have already been. A mouse-click will transport the player to the place where he or she wants to return to, without needing more time than a click will need. Surely, this is ellipsis, the term Genette uses as one example of the time-category duration. But this ellipsis has to be seen as the relationship between one event and its repetition and not as the relationship between one event and the whole narrative and therefore it has to be seen as distinct from Genette's description. The construct of narrative time as chronology is inseparably bound to the medium of the printed book. Time seems to float in narratives. From a beginning over different time-marks to an end. Intervals are created within which time is developing. Time in a digital medium is occasional and unforeseeable. Time, as well as space, is condensed in a way, which allows for multiple perspectives. These lead to a multiplication of narratives, all embedded in the boundaries of the given space.

Textspace

Textual Metaphors of Space

Spatial metaphors used in referring to the written text or to passages within the text create a textual space with places such as above, and below, center, and margin. These concepts refer to the physical and logical form of the written text: the shape as it appears on the page and the textual structure itself. On the one hand we have the two-dimensionality of the page or of the screen with its (visual) borders, on the other hand there is the one-dimensional linearity of speech and writing, as far as the result of the linearization process is concerned, and the one-dimensionality of reading in the sequence of time. Here we are at the intersection between space and time, when we are confronted with "the semiotic paradox of the spatial nature of the text" (cf. Nöth 1995) which contrasts with the linearity of speech in its temporality.

The City as a Text

The representation of the city is marked by ambiguity. Mobility within the city is opposed to a feeling of uprootedness, the freedom of non-obligation, informality and the multiplicity of possibilities are opposed to the impression of chaos, the fascination of novelty is opposed to the feeling of estrangement. These oppositions create tensions which constitute the city as a text. The perception and description of the city can be compared to the reading and interpreting of a text (see also "text vs. game"). The negative aspects are weakened by the attempt to find a coherent structure within the city. The experiences of the individual in modern cities, i.e. speed, simultaneity, and dissemination of perception, have been transferred into ways of representation by the avant-garde: movement, fragmentation, montage, and quotation are technical keywords, which literature and art particularly adopt from the new film medium. The city emerges as a palimpsest, divided into segments. The palimpsest serves as a model of artistic practice which connects real, imagined and fictive spaces to create a unified picture. The overwhelming multiplicity of signs leads to their dissemination. The inhabitant of the city is a modern reader. Parallel to an analysis of a poem, the analysis of the city should accordingly uncover overlying readings of the city, and the displacement of the signifiers should be provided.

Cyberspace

Bit City

"Bit city...This will be a city unrooted to any definite spot on the surface of the earth, shaped by connectivity and bandwidth constraints rather than by accessibility and land values, largely asynchronous in its operation, and inhabited by disembodied and fragmented subjects who exist as collections of aliases and agents. Its places will be constructed virtually by software instead of physically from stones and timbers, and they will be connected by logical linkages rather than by doors, passageways, and streets." (Mitchell 1995: 24)

Spatial configurations function as structural models -- or interfaces -- which allow a networked representation of different media: maps, the imagined plan of a city or a house are classical places of information storage. The classical Greek mnemonics used a house with several rooms to represent a subject of a prepared discourse or the encyclopedia of Diderot and d'Alembert projects knowledge on a map to demonstrate the connections between the different sciences. The new digital environments use and develop these concepts further. Their encyclopedic character and their spatial embedding is comparable to their classical precursors. The metaphorical schemata construct the digital city in analogy to a traditional city. This reflects the categorizing of our perceptions, the way we find access to the world we live in. Imagination and the organization of our memory defines the concepts we choose and how we compose possible worlds. Metaphors, which are derived from cultural artifacts such as buildings or maps, show that culture provides spatial models for metaphoric schemata.

Simulation

The 'real' ceases to exist. A shift from 'reality' to simulation is set up within the history of technology. The so called 'reality' is the result of constructive processes. An immediate access to an objective reality is not possible, so that the suspension of reality in our culture of simulation does not mean that we now live in unreal worlds. As Benjamin's analysis of the new reproduction technologies shows: technology does not distort the immediate or natural character of imagination, because imagination itself has to be interpreted as postponement as Kant and Peirce (and lateron Lacan) have demonstrated. Imagination as mediation is not replaced by the development of digital media, but remains the basis of our approach to them (cf. Tholen 1995).

Comparable to literature, virtual worlds have to develop new entrances. The interface is a new architectural entrance which allows us to overstep a borderline. The result is distance by a simultaneous artificial bridging of this distance. Bolz

(1990: 115) describes it as "your inside is out": The inside becomes a new outside. But the former outside can only be experienced as perception through our senses. By this process of perception it is transformed into a new inside: "your outside is in": It is the bridging of two worlds.

Cypertextspace

The different information which a hypertext opens when the user is clicking an icon and opens a new window characterizes the reader as appositioned outside, as an observer who has to open the windows of a complex building with rooms with different spatial arrangements and borderlines. Where is the reader's position in hypertext? Is it merely outside? This seems to be a strange metaphor which compares the reader to a voyeur.

The metaphorical and structural topology of hypertext can be compared with a metropolis. The reader is situated within this metropolis consisting of an immense number of buildings with much more windows to look through. All elements in a city are related and interconnected. The city can be read as a text with indicators such as center-periphery, hierarchical order, or city signs. Streams of "users" are not only part of its structure, but constitute its basic feature: dynamics and change within a stable network. Hyperspace cannot be merely unstable. There must be some mechanism which creates significant structures and reduces complexity in favor of the development of symbolic systems. The question should not be in how far hyperspace excels three-dimensional "real" space, but in how far the limits of space will return to hyperspace through its users.

Games

Games and media are comparable as far as their structures are concerned. Both obey internal rules which create an individual order and style: they create a separate temporal and spatial sphere within a constructed world which is distinct from our everyday experience. This constructed world transforms the perception of realities into possibilities; in so far it is the basis of the creation of possible worlds with their inherent quality of the "As-If". The "As-If" of possible worlds in regard to games means that they operate in a space of restricted validity. The "As-If" creates a situation in which the players of a game reflect their acting, this means they act on a metalevel which is medial in itself, as it is mediating between reality and game (Ursula Baatz 1993). But the comparison leads to further elements which are part of both, games and media: such as suspense, dynamics, ritual, and seduction, which

illuminate the cultural function of games and media. Computer games make us players in the sphere of media (Grassmuck 1995b: 43).

The internal structure of a game can be characterized by its rules and its boundaries. What is constituent for a computer game is the order and sequence of places within its boundaries and not the sequence of time or chronology. These places are connected by contiguity and not by causality as Jon Adams (1996b: 194) has shown. The leading question is "where to go next." In the constructed worlds of computer games information as well as experiences are connected to places. The CD-ROM *Myst* contains a narrative world whose story unfolds only to an active, intrusive user willing to explore independently the given space of the island in which different worlds are hidden. The success of this exploration is based on the user's capacity to solve problems in an active way. The adventure *Myst* represents a world seen from the user's perspective. We don't have to move a figure through a two-dimensional field but we manipulate a three-dimensional space immediately from our point of view.

New Narratives

The space of computer games is a technical one which emerges through the fusion of computer and television. The audio-visual space of TV and its function as a medium of presentation converges with the digital space of the computer and its functions as a medium of storage, transfer and computing. The result is an intermedial system with new capacities in regard to narrative time and narrative space. "New kinds of immersive narrative have begun to appear in which the "reader" interacts in new ways with a fictional environment. ... This new narrative form ... combines exploratory games and interactive narrative storyworlds" (Landow 1996: 233).

Myst

The world of *Myst* is a world of books which is placed on a surrealistic island. To start the game means to open a book. This book teleports the user into the world of *Myst*. The world of *Myst* seems to be a deserted island. Inside a library - the central place on this island - we find two books on separate desks. Each of them functions as a prison for a person, whose speaking we can hardly understand. The task is to find pages which are missing in these books and to insert them to free both men. Each new page makes their voices clearer, and we can hear them speaking. The pages are scattered over different worlds. The entrances to these worlds are also books which function as interfaces between the island's world and four hidden worlds which are at the same time new temporal spheres. To find these books the user first has to crack codes. We find a book each to teleport us into one of the

worlds of Myst and one to bring us back to the library. The very last book teleports us back into the world of Myst and now both imprisoned men can tell us where to find the last page to free them.

Myst: Intertext

Spatial motifs which are used in Myst are media of orientation and disorientation: for example a map in the library in connection with a window or peephole functions as a guide to the island. Both are indicators where to find the entrances to the hidden worlds. In Myst the window in connection with the map supports the user's orientation and functions as an interface between the multiple spaces within this storyworld. These examples are means of orientation which are necessary in a world which a user has to explore on his or her own. Media of orientation tend to appear as media of disorientation for a user who does not know how to use them. This is for example obvious in an underground labyrinth which can only be crossed when the user knows in advance which directions to choose. The player's capacity for mental reconstruction can help to transcend a mental image of geometric relationships among the linked parts of the game. Such efforts to conceptualize the work spatially can be quite successful, especially if the author helps out by providing means of orientation. A reader can navigate the game not just putting together a reading but also creating a mental model of the game's architecture. The spatial motifs of Myst cite literary precursors. Their spatial function is an intertextual one: the labyrinth alludes to the Greek labyrinth as well as to the technological set of Science Fiction; added to this SF set we find an oversized gear wheel, and a spaceship. The library and the books allude to the world of Borges' or Eco's libraries as well as to the world of fiction and storytelling in printed books in general. We find two wells which remind us of the function of a well in fairy-tales and last but not least the cottages in the trees which allude Calvino's Barone rampante who lives in the trees.

Myst: Intratext

A further narrative dimension is added by the technique of mise en abîme, a reflexive structuration, which results in a front-to-back dimensionality, thus creating a three-dimensional narrative space. A reflexive structuration is given through the motif of the printed book. The book is used as a means of orientation. But a second important function of the book lies in its mediation between the reader or user and the narrative worlds. It is the entrance to worlds created by an author or, as in Myst, worlds created by two programmers. The book is the traditional interface. In the case of Myst this interface is doubled in an interesting way: As interfaces of the medium computer, the screen and the mouse are typically named. In Myst an additional interface is chosen which illuminates the narrative function of the

traditional printed medium. The narrative space in *Myst* mirrors well-known narrative spaces in a new dynamic and interactive medium. The spatial configurations and elements in a computer game oscillate between being signs and being images. This means that the images used in a computer game have to be read in a way similar to words in a written text. This reading process depends on the underlying program which can be compared to the spatial metaphor of traveling. This metaphor combines the static aspect which is connected to space with the dynamics of time. To travel means to pass different places in time.

As Tabbi and Wutz (1997) have shown, computer graphic interfaces construct a rich 3-dimensional space through the successive layering of 2-dimensional grids.

"These interfaces have been generally understood as visual and spatial. A closer look at the sedimentary overwriting of these grids, however, belies the attempted separation of time and space. A computer graphic is not in itself spatial. ... Every location ... in the grid ... is in fact equidistant from any other location; what separates one point from another is the processing time it takes to link the locations. That many literary commentators continue to regard the electronic image as primarily spatial and immaterial testifies, not only to the abstract, unseen, and generally ignored processes that underlie the operation of a microprocessor, but to the continuing power of the "pictorial turn," a modernist aesthetic that seeks to turn temporal processes into spatial ones" (Tabbi & Wutz 1997).

Game vs. Text

Computer games are not texts the same way a printed literary work is a text. Are they texts at all? They produce textual or interwoven structures for aesthetic effects. In so far they are comparable to literary texts. But a computer game is a program for the production of a variety of narrative texts. Confronted with a network such as a computer game, the idea of a narrative text as a labyrinth, a game, or an imaginary world seems to be appropriate. Within this world the player can explore or play around and detect the rules. As Aarseth (1997) puts it:

"A reader, however strongly engaged in the unfolding of a narrative, is powerless. Like a spectator at a soccer game, he may speculate, conjecture, extrapolate, even shout abuse, but he is not a player. Like a passenger on a train, he can study and interpret the shifting landscape, he may rest his eyes wherever he pleases, even release the emergency brake and step off, but he is not free to move the tracks in a different direction. He cannot have the player's pleasure of influence: "Let's see what happens when I do this." The reader's pleasure is the pleasure of the voyeur. Safe, but impotent."

The player of a computer game, on the other hand, is not safe, and possibly he or she is not a reader at all. Trying to experience a computer game is more like a

personal improvisation with the risk of failure. The tensions at work in a computer game are not incompatible with those of narrative texts, but they constitute an extension: a struggle not merely for interpretive insight but also for narrative control. The reader in a computer game comes to be a player. There is a difference between games and narratives and we cannot ignore their essential qualities, but there is also significant overlap between both of them. While *Myst* offers experiences in constructed worlds, it implicitly draws our attention to the possibilities of electronic linking; however, their users learn little about their own existence, the thoughts of others, or commentaries about the one or the other - notions many of us associate with narrativity. While an understanding of and reflection on our world is missing, the cybertextual nature of computer games allows its users a better understanding of the potential of multimedia and the future of multimedia literature.

Hybridization

In digital media all traditional forms again become options of art and design again. This leads to a double coding. Cultural artifacts belong to the sphere of art as well as to the sphere of popular culture. The term hybrid culture refers to this intersection just as the convergence of forms and meanings. This convergence combines forms from traditional areas of art, mass communication and popular culture by employing digital media. Hybridization is a phenomenon resulting from the increased mediation of vast areas of human experience, which is dependent on the storage and processing capacities of digital media. Therefore, hybrid culture is closely linked to the development of digital media. Computer games are one example that can elucidate this process of hybridization. The concept of hybridization does not limit itself to the study of computer-driven narrativity, which would be an arbitrary and unhistorical limitation comparable to a study of literature that would only acknowledge texts in paper-printed form. The concept of hybridization focuses on the mechanical organization of the text or - in our case - of the game, by regarding the complexity of the medium as an integral part of the literary exchange.

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